



# Advancing Clinical Care and the Science of Sarcoma Orthopaedic Oncology at Penn



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The Orthopaedic Oncology service at Penn is part of a multidisciplinary team of caregivers that is focused on our patients with bone and soft tissue tumors. This includes the care of patients with benign and malignant primary tumors as well as patients with metastatic bone disease. With the departure of Dr. Richard Lackman and the arrival of Dr. Kristy Weber in 2013, the program shifted to the Hospital of the University of Pennsylvania (HUP) and the Perelman Center for Advanced Medicine (PCAM). It is now in close proximity to the Children's Hospital of Philadelphia (CHOP), the Abramson Cancer Center administration, the U. Penn School of Veterinary Medicine, and the laboratories of investigators focused on sarcoma research. The Orthopaedic Oncology core team involves Dr. Weber, Bethany Sterling, NP, and Angeline Mombrun, Administrative Coordinator along with a PGY4 orthopaedic resident. A PGY2 orthopaedic resident also participates on the service in addition to managing their primary role of evaluating and treating the HUP inpatient and ER consults. Patients are seen 2 days each week in PCAM clinic, and surgeries are performed 1-2 days per week at HUP. Starting in April, 2016, Bethany Sterling, NP will run a weekly Bone Metastasis Clinic at our Valley Forge location.

There is a comprehensive clinical multidisciplinary team that treats patients with bone or soft tissue sarcoma. This group meets weekly at PCAM for a clinical care conference to discuss the presentation and differential diagnosis of new patients as well as the ongoing multimodal therapy for existing patients. Our musculoskeletal radiology team leads the conference under the direction of Dr. Ronnie Sebro who joined Penn in July, 2015. Our musculoskeletal pathology team provides expertise about the tumor biopsies and teaches all of us about the histologic appearance of these rare tumors. The medical oncology team is led by Drs. Chip Staddon and Lee Hartner who practice at Pennsylvania Hospital and have provided high level care for sarcoma patients for many years in the Penn community. Dr. William Levin is the lead radiation oncologist at PCAM/HUP who utilizes proton radiation and IMRT for patients with sarcoma, and he works with a network of radiation oncology colleagues throughout the Penn hospital system. Dr. Giorgos Karakousis is a surgical oncologist who treats patients with melanoma as well as retroperitoneal, abdominal and extremity sarcoma. In addition, we have a large surgical team including neurosurgery, plastic surgery, colorectal surgery, urology, and gynecologic oncology surgery that collaborate to surgically resect complex tumors about the spine and pelvis and reconstruct the defects to allow maximal function. Finally, there is a large supportive care team at Pennsylvania Hospital and HUP/PCAM to who assist patients with bone

and soft tissue cancers including nurse practitioners, nurses, social workers, nutrition specialists, physical/occupational therapists, prosthetic/orthotic specialists and others focused on alternative therapies. Patients are generally seen in the PCAM orthopaedic oncology clinic within 1-2 days (and often same day) with new bone and soft tissue lesions. For those with concerning lesions, an image-guided biopsy is arranged within a few days by our MSK Radiology team. The diagnosis is made within 2 days in the vast majority of patients by our MSK Pathology team. All of the members of our clinical Sarcoma team prioritize seeing patients expediently and efficiently to make an accurate diagnosis and provide expert treatment.

Dr. Weber took over the orthopaedic oncology practice at CHOP immediately upon departure of Dr. John Dormans in January, 2016. She sees patients in CHOP clinic during 2 days each week and operates there 1 day each week. Dr. Alex Arkader joined the CHOP orthopaedic team in August, 2015 as an expert in orthopaedic oncology and pediatric deformity. He was recruited from LA Children's Hospital where he had a robust pediatric orthopaedic practice. He is originally from Brazil and completed prior fellowship training at CHOP with Dr. Dormans. There is capacity to see children with bone or soft tissue tumors every day of the week. Patients are now diagnosed via image-guided needle biopsy in the vast majority of cases. The current team of Drs. Arkader and Weber have the ability to perform innovative and complex limb salvage procedures in children with these diseases. All types of reconstructions of the shoulder, pelvis, hip, knee and elsewhere in the skeleton are performed utilizing cadaveric allografts, vascularized bone and periosteal grafts, and standard or expandable joint megaprotheses. Dr. Arkader's expertise in pediatric skeletal deformity brings added ability to recreate equal leg lengths in skeletally immature patients with limb length discrepancies due to tumor resection or systemic chemotherapy. An active marketing effort is underway to build the Bone and Soft Tissue Tumor Program along with our pediatric and radiation oncology colleagues.

One of the features that allows the Penn Sarcoma program to stand above other centers in the region and nation is the presence of a collaborative scientific team focused on new discoveries in sarcoma. Within the past year, Karin Eisinger, PhD and Malay Halder, MD, PhD were recruited to help build this team and have joined Celeste Simon, PhD (senior investigator at Penn focused on hypoxia and metabolism in sarcoma and other diseases), Margaret Chou, PhD at CHOP, and Nicola Mason, PhD, BVetMed. These investigators utilize sophisticated murine and canine spontaneous sarcoma models to study these diseases. They are focused on immunology,

hypoxia, and epigenetics among other areas of study in both bone and soft tissue sarcomas.

In summary, the goals of the Penn Sarcoma program are to prioritize scientific discovery, translational research and

outstanding clinical care to result in better outcomes for our patients with bone and soft tissue tumors. The Penn Orthopaedic Oncology service plays a key role in achieving these goals.